there have been three periods of eruption since the Middle Tertiary: (1) That of basic andesites, terminating in outpourings of rhyolite. (2) That of spongy porous rocks and ashes, marking the beginning of a tranquil period. (3) That of the basalts, continuous with Quaternary volcanic eruptions in various parts of the Sierra. The second period was marked by circulation of thermal waters in the fissures leading to the deposition of quartz with the sulphides.

The intimate structure of the veins, their variations in relation to the adjacent rocks and to each other, as well as the distribution of ores, are considered in a chapter by the same authors. Sanchez contributes a mathematical discussion of the fracture systems, arriving at practically the same conclusions with Daubree. Ordoñez gives results of investigation of the rocks microscopically, which are illustrated upon a plate. Other chapters by Sanchez, Rangel and Castro discuss the more purely economic features, exploitation, drainage, machinery and metallurgical methods in such a way as to be serviceable to those for whose special advantage they were written.

The volume is creditable alike to the authors and to the Minister of Internal Affairs, who has encouraged the expansion of the work.

J. J. Stevenson.

Geologic Atlas of the United States, Folio 34. Buckhannon, West Virginia, 1897.

This folio consists of a descriptive text, a topographic map, a sheet of areal geology, one of economic geology, one showing structure sections, and finally a sheet giving a generalized section and table of synonymy. The authors are Joseph A. Taff and Alfred H. Brooks.

The quadrangle comprises an area of 931½ square miles and for the most part is located in the Appalachian coal field near the center of West Virginia, between latitudes 38°, 30′ and 39° and longitudes 80° and 80°, 30′. It embraces portions of Lewis, Upshur, Randolph, Webster, Braxton and Barber counties. The southeastern corner of the quadrangle lies in the district of parallel ridges which characterize the western border of the Great Valley, or central division of the Appalachian province. Rich and Mill, Back Fork, and Point mountains, which attain elevations or more than 4,000 feet, are the principal border ridges here mapped. From these elevated ridges the surface, an inclined peneplain, falls away toward the northwest, down to an elevation of near 1,700 feet. Six rivers have their sources within this quadrangle, West Fork of Monongahela, Buckhannon, Middle Fork, Valley, Little Kanawha, and Elk, all belonging to the Ohio drainage. These rivers, having their powers of corrasion augmented by the elevated and tilted surface of the country, have dissected the once nearly first country by deep, narrow channels.

The stratigraphy column makes a section of about 4,600 feet of rock. Sixteen hundred feet of interstratified Devonian sandstone and shale are divided nearly equally between the Jennings and Hampshire formations. Of the Lower Carboniferous there are about 1,100 feet, of which less than 100 feet is Pocono sandstone; 350 feet of Greenbrier limestone, and 650 feet of red shale, brown sandstone and conglomerate, making the Canaan formation. The remaining 1,900 feet comprises the coal measures known in this folio as the Pickens sandstone, Pugh formation, Upshur sandstone and Braxton formation, which are composed of conglomerate, sandstone and shale with beds of coal.

The structure of this district is typical of the two provinces which it includes. In the southeastern portion, east of Rich Mountain, the structure is that of the folded region of Great Valley, which is characterized by long parallel anticlines and synclines with north-southwest axes. West of Rich Mountain the typical Cumberland Plateau structure prevails. Here the strata are slightly inclined and gently folded.

The only product of economic importance is coal, of which there are seven workable beds. Two of these occur in the Pickens sandstone, three in the Upshur sandstone and two in the Braxton formation. The coals are from two to six feet thick. They have not been worked on a commercial scale, because other areas of productive coal lie between this field and the seaboard and nearer to large centers of coal consumption, both north and west.

On the economic sheet of the folio structural contours at intervals of 100 feet are represented by white lines. These, as drawn, represent the inequalities of the upper surface of the principal coal bed in the Upshur sandstone. The thickness of the strata being known, it is evident that the position of any other coal seam or bed may be determined from this datum plain.

Laboratory Manual of Inorganic Chemistry. By RUFUS P. WILLIAMS, in charge of the Chemical Department of the English High School, Boston. Boston, Ginn & Co. 1896.

This book, which is intended especially for use in elementary schools, is arranged so that each page is devoted to a separate topic. The alternate pages are left blank for notes and the experiments are unusually full of minute directions. This minuteness of directions may be well in the case of one who is working alone and can use the book to aid him in difficulties; but when working under the eye of the instructor it is questionable whether such close attention to details given in the book and, as in this case, working by rules is not apt to make the student too dependent, instead of teaching him to observe for himself and to devise, to a certain extent, the methods of work he shall follow in each experiment. The free use of symbols in other than equations is especially objectionable in the early stages of the study, as the student becomes impressed with the idea that proficiency in the use and manipulation of chemical symbols is the thing to be acquired and not the principles of the subject. Difficulties encountered and overcome by the ingenuity of the student are a great incentive and give him confidence in his own powers. After taking up in order the common non-metallic elements, the author gives the usual methods of separating the members of the different groups of metals. These are given without any preliminary study of the different members of the groups, which would enable one to understand the principles upon which the separations are based and must be entirely mechanical in their nature. No text-book is recommended for use with this laboratory guide, and while it can probably be used with good results in many cases it must be with the constant attention of the teacher and the elimination of some features, especially the part relating to the separation of the metals.

J. E. G.

Elements of Chemistry. By RUFUS P. WILLIAMS, in charge of the Chemical Department of the English High School, Boston. Boston, Ginn & Co. 1897.

The title of this book is rather a misnomer, as the author has gone beyond the capacity of an elementary student and has introduced much matter which would only bewilder a beginner in the subject. As he says in the preface, 'the division of matter into coarse and fine print enables a choice to be made' according to the needs of the class. He is a strong advocate of graphic methods of representing compounds, and 'and many topics—such, for example, as valence, etc.—have been treated in quite an original manner.' On turning to this chapter we find that he represents valence graphically 'by using cubical kindergarten blocks with small screw-eyes and hooks' to represent the bonds and their method of attachment. Before studying the simplest element he instructs the student in the methods of writing symbols and finding molocular weights by rule. The subject, omitting the theoretical part, is treated in a very thorough manner for an elementary book; but the arrangement, especially that of the non-metals, is not as systematic as it might be. The latter part of the book contains an account of some common organic substances and a chapter on the chemistry of fermentation and of life.

J. E. G.

Congreso Internacional de Americanistas. Actas de la Undecima Reunion, Mexico, 1895. Mexico, 1897. 1 Vol. Pp. 576.

The previous volumes of the International Congress of Americanists all contain some valuable articles and all a good deal of trash. In both these respects the present Compte-rendu resembles its predecessors. Why people who pretend to be scholars still want to publish articles showing that the name of the Atlas mountains is derived from the Nahuatl 'Atlan;' that the Otomis are related to the Chinese; that the cross of Palenque is a proof of Buddhistic